Juli 2022

Taking Ownership

The effects of peer feedback on students' goal orientation

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Master Thesis

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Acknowledgements

Before starting this thesis, I would like to take the opportunity to express my thanks to the persons without whose guidance and encouragement it would not have been possible to successfully complete this work. First and far most I would like to express praises and thanks to God for his blessings throughout my research and in my studies the past three years.

I would like to express my deep gratitude towards dr. N. Dmoshinskaia for guiding me through the process of research and writing this thesis. Thank you for your optimism and patience. Your constructive feedback helped me to stay focussed and not stray from the main argument. I would also like thank dr. A.H. Gijlers for offering a fresh pair of eyes to critique my writing and for giving valuable feedback. Furthermore, I would like to thank all the EST professors and staff for all their valuable teaching and support during this master programme. I would like to thank my fellow students at the UT with whom I collaborated on numerous projects leading up to this thesis. Thank you for all the valuable coffee breaks and fellowship. I would like to thank all my colleagues at de Passie for supporting me the past three years and for granting me the time and opportunity to study next to my work. Finally, this thesis could not have been made without the love and support of my friends and family. I am forever grateful for your encouragement, and support the past three years. Words cannot express my gratitude towards my wife and daughter. Your belief in me has kept my motivation high and has given me the perseverance to see it through. Thank you for all the time you have given me to complete this endeavour.

Abstract

Peer feedback in education has often been used as a way of unburdening teachers, or as complementary to teacher feedback. However, peer feedback has many potential benefits when utilized as a learning activity rather than just formative assessment. Studies have mentioned that, among other things, peer feedback strengthens a feeling of ownership of learning in students. These studies, however, mention ownership of learning as a by-product, rather than the focus of the study, and use the term ownership of learning as an expression rather than a clear construct. Studies testing the effect of peer feedback on a clear construct of Student Ownership of Learning (SOL) have not been found. There is evidence, however, of peer feedback having a positive effect on a number of elements within the SOL construct, still, some elements have not yet been studied. Therefore, the aim of this research was to add to this theory by looking into the relationship between peer feedback and an understudied element of SOL, namely mastery goal orientation. It was hypothesized that participating in continuous peer feedback sessions strengthens the mastery orientation, and thus, since mastery goal orientation is a component of SOL, it strengthens SOL. This was investigated through an intervention with a group of Dutch secondary school students that were assigned writing assignments which followed online peer feedback cycles. Before and after the intervention, the students' goal orientation was measured though a questionnaire. The results of the study show a statistically significant increase in the mastery goal orientation which adds scientific credibility to the idea that peer assessment indeed strengthens student ownership of learning.

Keywords: Peer Feedback; Peer Assessment; Student Ownership of Learning; Goal Orientation

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1. Introduction

Peer feedback has been a valuable method in the second language (L2) writing class, enabling teachers to apportion the assessment of students' work, and persevere in L2 courses with far too many students (Yang et al., 2006). In addition to alleviating teacher stress, peer feedback can be seen as complementary to teacher feedback since it is more frequent, immediate and quantitative (Topping, 1998). Furthermore, apart from peer feedback being used as a part of assessment *of* learning, it is increasingly used as a part of assessment *for* learning (Gielen & De Wever, 2015).

Studies show that assessment for learning is beneficial for cognitive as well as meta-cognitive development (Fan & Xu, 2020; Ion et al., 2019; Li et al., 2019) in both giver and receiver of the feedback (van Popta et al., 2017). Meta-cognition is a reliable predictor of academic success (Coutinho, 2007) as it puts students behind the wheel of their own thinking and learning, and thus, gives them an opportunity to take ownership. Consequently, Conley and French (2013) conceptualized Student Ownership of Learning (SOL) as a result of a number of cognitive, non-cognitive and meta-cognitive processes.

While research on the relationship between peer feedback and any clear conceptualization of SOL is lacking, there are a number of studies that report that peer feedback fostered a feeling of ownership in their studied students (eg., Brazeal et al., 2016; Chang, 2012; Dmoshinskaia, 2021; Dooley & Bamford, 2018). These studies, however, refer to ownership as an expression rather than a measurable construct. There is, however, evidence that peer feedback positively influences the development of nearly every element in Conley and French's construct for SOL: motivation, engagement, self-direction, self-efficacy, self-confidence, meta-cognition, and self-monitoring (eg., Hsia et al., 2016; Lee & Evans, 2019; Yu et al., 2020). These studies, however, were not done from the perspective of the elements being a part of the SOL construct. Studies measuring the relationship between peer feedback and Conley and French's construct for SOL (2013) as a whole, have not been found. The only elements that have not been tested against peer feedback are goal-orientation and persistence. This gives credibility to the idea that peer feedback indeed fosters SOL, however, testing for the effect on 'goal-orientation' and 'persistence' is essential to accept this hypothesis. If the results of this research show a negative influence of peer feedback on the students' goal orientation, it can still be said that peer feedback has a positive influence

on the above mentioned elements, yet, it cannot be said that peer feedback fosters SOL as a whole.

Therefore, the goal of this study is to add to this knowledge base and test the relationship between peer feedback and one of the two missing elements, namely: goal-orientation. This element was chosen over persistence since the setting of the intervention and the timeframe available were ideal to test a change in goal orientation, yet, to thoroughly test the effect of peer feedback on persistence would need a study with a more longitudinal character. It is hypothesized that peer feedback will alter the goal-orientation of secondary school students towards a more mastery-oriented orientation.

2. Theoretical Framework

2.1 Peer Feedback

Peer feedback started as a substitute for, or addition to, feedback from the teacher and it is still widely used for this purpose. Reviewing written work is a time consuming task and, since teachers have limited time, they are often forced to only giving general feedback like a grade and some ticks or question marks instead of in depth feedback that would evoke revision (Falchikov, 2004). Therefore peer feedback is often used in populous L2 classes (Yang et al., 2006) and large online courses (MOOCs) (Kasch et al., 2021).

According to Yang et al. (2006) the impact of feedback given by peers positively differs from that given by a teacher. In their study, peer feedback brought about more revision in the meaning of the text whereas teacher feedback generated more changes at surface level. Moreover, peer feedback caused more successful changes than teacher feedback. Topping (1998) confirms this in saying that peer feedback of writing is able to yield at least the same results as teacher feedback, sometimes even better. This proves that peer feedback can be a useful addition to teacher feedback in assessing student's written work.

However, studies found that peer feedback is more than just formative assessment (Gielen & De Wever, 2015; Ion et al., 2019). Engaging in peer feedback has many potential benefits, aiding in the development of both cognitive as well as meta-cognitive abilities (Li et al., 2019; Topping, 1998). These benefits are not all necessarily triggered in the receiver, but some of them, rather in the giver (Ion et al., 2019; van Popta et al., 2017). Peer feedback is

therefore more and more used as a learning activity, rather than just a form of assessment. When utilizing peer feedback as a learning activity, the purpose of assessment shifts from assessment *of* learning to assessment *for* learning (Gielen & De Wever, 2015).

While giving peer feedback, different processes happen within the assessor. To produce quality feedback for their peer, student assessors have to be cognitively involved with the topic as they have to (a) actively think about the assessment criteria, (b) determine strengths and weaknesses in the peer's product, and (c) provide constructive feedback (Sluijsmans et al., 2002). Furthermore, students might compare the work of their peers with their own, which triggers a process called reflective knowledge building (van Popta et al., 2017). These processes will not only help the assessee, but will also strengthen content knowledge in the assessor (Cho & Schunn, 2007).

On the meta-cognitive side, a study by Liu et al. (2001) reported 77% of the studied students displaying meta-cognitive abilities such as planning, monitoring, regulation and critical thinking while continuously participating in peer feedback. Furthermore, peer feedback has been reported to encourage student autonomy (Ion et al., 2016; Yang et al., 2006), promote self-assessment (Topping, 1998) and self-efficacy (Bürgermeister et al., 2021; Lee & Evans, 2019). These processes encourage a feeling of ownership of learning in students. Ownership of learning itself has also been reported as a positive side effect of peer feedback (Brazeal et al., 2016; Chang, 2012; Dmoshinskaia, 2021; Dooley & Bamford, 2018), however, a clear conceptualization of ownership of learning is missing in these studies. The term is used in the general sense and not indicating a specific construct. This raises the question: Will peer feedback be positively related to student ownership of learning if the latter is adequately conceptualized?

2.2 Student Ownership of Learning

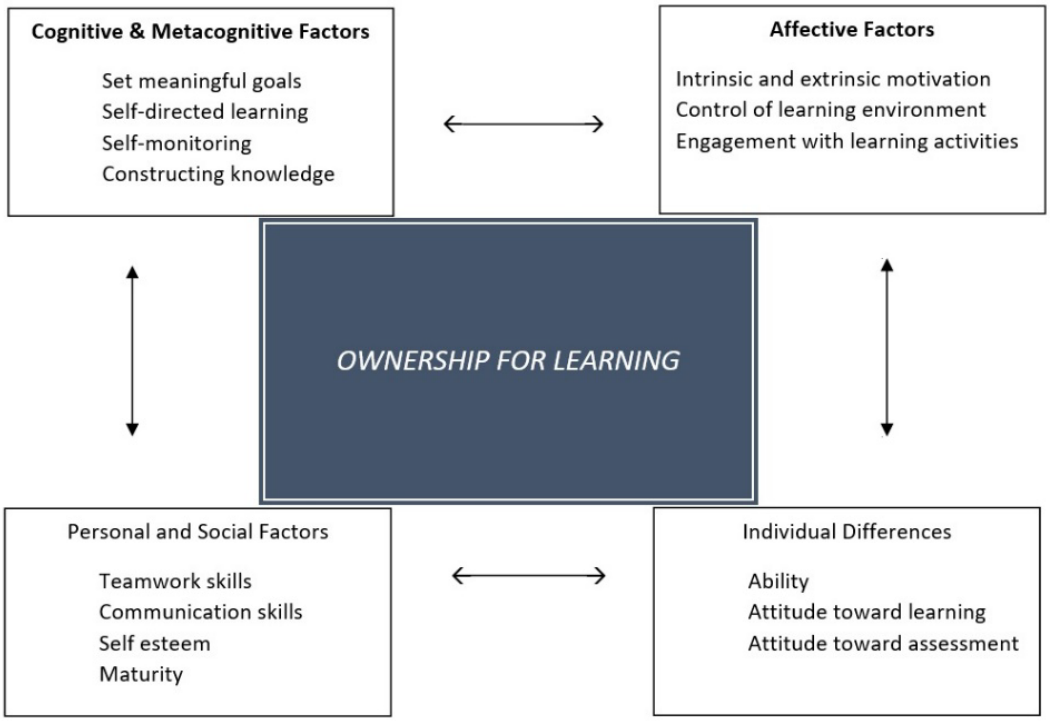
When reviewing the literature on the construct student ownership of learning (SOL) there are three major studies that try to conceptualize SOL, namely: Savery (1998), Milner-Bolotin (2001), and Conley and French (2013). All three provide an accompanying model.

2.2.1 Conceptualization of Student Ownership of Learning

Firstly, there is the earliest conceptualization which is that of Savery (1998) who, interestingly, calls it 'ownership *for* learning' and bases his conceptualization of SOL on Vygotskian social constructivism (Vygotsky & Cole, 1978) in stating that SOL can be

acquired through interactions in the 'zone of proximal development'. His model (see figure 1) is comprised of four quadrants: cognitive and meta-cognitive factors, affective factors, personal and social factors, and individual factors. Each quadrant contains a number of descriptors that refer to observable behaviour associated with each cluster of factors. Savery (1998) concluded his paper with a call for refinement of his model.

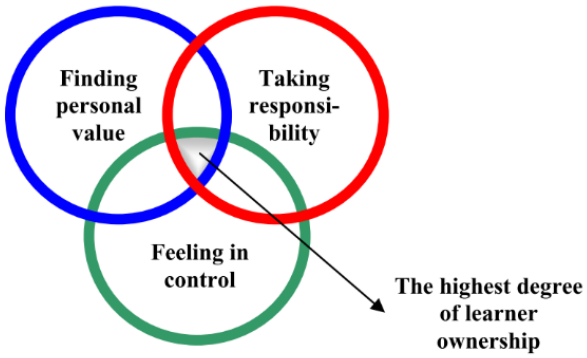
Figure 1



Note. Savery's model for ownership for learning. From "Fostering ownership for learning with computer-supported collaborative writing in an undergraduate business communication course" by J.R. Savery, 1998, *Electronic collaborators: Learner-centered technologies for literacy, apprenticeship, and discourse*. p. 105.

Secondly, there is the conceptualization of Milner-Bolotin (2001) (see figure 2) who calls SOL 'learner ownership' and describes SOL as an interplay between three components of the learning process: finding personal value, taking responsibility, and feeling in control.

Figure 2



Note. Milner-Bolotin's model for Learner Ownership. From "The effects of topic choice in project-based instruction on undergraduate physical science students' interest, ownership, and motivation." by M. Milner-Bolotin, 2001, *The University of Texas at Austin*. p. 42.

Lastly there is the conceptualization of Conley and French (2013) (see figure 3) who regarded SOL a key component of college readiness. Their conceptualization is a cycle of different elements that revolve around SOL: motivation and engagement, goal orientation and self-direction, self-efficacy and self-confidence, meta-cognition and self-monitoring, and persistence. The elements interact both linearly as well as iteratively. They did not include a scale or instrument in their study to measure SOL but mention that SOL can be inferred from observed behaviour.

Figure 3

Model of Student Ownership of Learning

Note. Conley and French's model for student ownership of learning. From "Student Ownership of Learning as a Key Component of College Readiness" by D. T. Conley and E. M. French, 2013, *American Behavioral Scientist*, *58(8)*, p. 1021.

When comparing the different models, most overlap is found in the models of Savery (1998) and Conley and French (2013). All elements of Conley and French (2013), with some slight variations in terms, can be found in Savery's (1998) quadrants. Milner-Bolotin's model (2001) takes a more abstract approach towards SOL, however if viewed as composite variables, Milner-Bolotin's Finding Personal Value could be comprised of Conley and French's Motivation, Engagement and Goal Orientation. Taking responsibility could be comprised of Meta-Cognition, Self-Monitoring, Self-Directing and Persistence, and the Feeling of Control could be comprised of Self-Efficacy and Confidence. The conceptualization by Conley and French (2013) however, is the most frequently used in recent studies regarding SOL (eg., Allison, 2021; Nguyen et al., 2021). It is more extensive than that of Milner-Bolotin (2001) and more concise than that of Savery (1998). Therefore, the conceptualization of Conley and French (2013) is used in the present study.

2.2.2 Peer Feedback and the Elements of the SOL Model

When comparing the elements of the SOL model with different effects of peer feedback, a relationship between peer feedback and student ownership of learning becomes clear. A positive relationship has been found between peer feedback and many elements that, according to the model, indicate a higher level of student ownership. Studies show that peer feedback enhances motivation (Hsia et al., 2016; Liu et al., 2001; Topping, 1998), student engagement (Fan & Xu, 2020; Yu et al., 2020), fosters self-direction (Harrison et al., 2015), self-efficacy (Bürgermeister et al., 2021; Lee & Evans, 2019), self-confidence (Ebadijalal & Yousofi, 2021), self-monitoring (Cao et al., 2019; Lee & Evans, 2019), and meta-cognition (Li et al., 2019; Topping, 1998). All of which are elements of Conley and French's (2013) model. However, evidence of peer feedback influencing the two remaining elements of the SOL model (goal-orientation and persistence) have not been found. There are studies that looked into the effect of goal orientation on peer feedback (eg., Leenknecht et al., 2019; Yan, 2018) Leenknecht et al. (2019), for example, found that mastery goal orientation triggered (peer) feedback seeking behaviour. Studies that took the other way around, however, investigating the effect of peer feedback on goal orientation, have not been found. Therefore, this study aims to add to the above mentioned relationship between peer feedback and SOL by looking into the effects of peer feedback on goal orientation.

2.3 Goal Orientation

Goal orientation theory focuses on how people think about themselves, their assignments, and their performance. (Midgley et al., 1998). It is not so much concerned with *what* people want to learn but rather *why* (Maehr & Zusho, 2009). The theory emerged in the 1980's and 1990's and has been among the most acknowledged and supported theories in educational psychology (Anderman et al., 2003; Maehr & Zusho, 2009). Research distinguished two goal orientations: the 'mastery orientation' (MO) and the 'performance orientation' (PO) (Elliott & Dweck, 1988). These goal orientations trigger a certain mindset towards assignments and performance.

There are two ways a student can regard a high grade. The first reason for students to excel might be because they want to learn and understand the material. Getting a high grade would indicate mastery of the learnt material. These students show a mastery goal orientation. The second reason for students to excel would be to show others that they are smart. The high grade would then indicate academic performance. These students show a performance goal orientation. These orientations, while being independent measures, are by no means mutually exclusive (Tuominen et al., 2020). A student can hold multiple goal orientations simultaneously. A student might value both academic performance and mastery over the learnt material, however, one of both is often more dominant (Van Yperen, 2006).

The same orientations can be observed when exposed to failure. According to Elliott and Dweck (1988), performance oriented people tend to respond 'helpless', ascribe their failure to low ability, and are affected negatively which results in deterioration of performance. People that respond more mastery-oriented, however, are not fixated on the failure and seek ways to improve themselves, and are therefore affected positively, which leads to improved performance (Elliott & Dweck, 1988).

Elliott and Dweck (1988) demonstrated that, apart from students' personal goal preference, a specific goal oriented reaction can be triggered by appointing tasks with specific goals. When students are specifically assigned to demonstrate knowledge, the underlying goal is performance oriented. Students that regard themselves low in ability will tend to respond 'helpless' when faced with negative feedback. On the other hand, when the goal of the assignment is learning goal oriented, negative feedback will trigger the mastery-oriented response, even in people that deem themselves low in ability (Elliott & Dweck, 1988). Then people will not respond 'helpless', yet, see failure as an opportunity to learn.

2.3.1 Approach or Avoidance

Studies show that performance goal orientation as well as mastery goal orientation can manifest itself in one of two ways. One can either try to approach something favourable, or try to avoid something unfavourable (Elliot & Harackiewicz, 1996; Van Yperen et al., 2009). Therefore, the mastery orientation is sometimes divided into mastery-approach (trying to attain self-improvement) and mastery-avoidance (trying to avoid performing worse than one has done before) and the performance orientation is sometimes divided into performance-approach (trying to perform better than others) and performance-avoidance (trying not to perform worse than others) (Elliot & Harackiewicz, 1996; Poortvliet et al., 2015; Van Yperen et al., 2009). These distinctions shed light on the goal behind the goal. While approach goals have been found to yield adaptive patterns of learning, avoidance goals have often proven to yield maladaptive patterns of learning (Elliot & Harackiewicz, 1996; Poortvliet et al., 2015).

The goal orientations model has evolved from a two, to a three, to a four factor model. The first only including mastery and performance orientation (Elliott & Dweck, 1988), the second adding performance approach and performance avoidance orientation (Elliot & Harackiewicz, 1996) and the third adding mastery approach and mastery avoidance orientation (Elliot & McGregor, 2001). However, agreement on how many factors are to be included in the goal orientation model is lacking (Huang, 2016). Since mastery avoidance orientation is difficult to measure (Strunk, 2014) and not included in the questionnaire used in the present study, this study aims to utilize a three factor model consisting of a general mastery orientation, the performance approach and performance avoidance orientation.

2.4 Goal Orientation and Peer Feedback

Mastery oriented students as well as performance oriented students can achieve favourable results and be equally motivated (Anderman et al., 2003; Midgley et al., 1998). However, the reason for the motivation is different. Since peer feedback sessions are particularly focused on assignment improvement rather than grading, it is expected that students that normally tend more towards the performance orientation will be show an increase in the mastery orientation. Peer feedback is therefore expected to contribute to student ownership of learning by adhering to Conley and French's (2013) challenge to change students' goal orientation from a more performance-oriented mindset (they used the term compliance mindset) to a more mastery-oriented mindset.

2.5 The Influence of Attitude and Engagement

A popular saying among teachers is: "You can lead a horse to water, but you cannot make him drink." In the light of the present study, the water might represent peer evaluation, the drinking might be active participation in a peer feedback session, and the effect of this is a stimulation towards mastery orientation. However, the stubborn horse that refuses to drink would in this case mean a passive student that does not actively take part in a peer feedback session and therefore gains no stimulation towards mastery orientation. Studies show that passiveness in peer feedback sessions might result in a low level of learning and a negative peer feedback experience (eg., Wu & Schunn, 2021).

A possible reason why students remain passive might be found in behaviour theory. According to planned behaviour theorist Ajzen (1991) active behaviour is a consequence of intention, and intention, in its turn, is subject to three factors: (a) specific attitude towards a behaviour, (b) subjective norm, and (c) perceived behaviour control. The first factor implies whether or not something is perceived desirable or beneficial, the second involves the perspective of the social environment, and the third relates to confidence of capability. This would mean that attitude towards peer feedback, both individual as well as communal, and the expected competence in giving feedback, might be of influence on the active engagement in peer feedback sessions, and therefore on the relationship between peer feedback sessions and mastery goal orientation. Cao et al. (2019) mentioned that a negative attitude towards peer feedback signified a participant's low engagement and prevented him from benefitting from the peer feedback experience. On the other hand, a positive attitude towards peer feedback might predict active behaviour and might therefore have a positive influence on the relationship between peer feedback sessions and goal orientation.

2.6 Considerations for Peer Feedback Sessions

To conclude this theoretical framework, two considerations for peer feedback sessions are mentioned that were found in literature, and will be adopted in the present research. The first is the call for anonymity (van der Hoven et al., 2012; Wang, 2014). In their studies, Vanderhoven et al. (2012) and Wang (2014) associated non-anonymous peer feedback with undesirable social effects such as peer pressure and found that participants were reluctant to giving negative feedback. They advise to arrange a system in which peer feedback can be given anonymously. Another consideration is using the native language instead of the target

language, when giving feedback to avoid feedback of poor quality due to a lack of proficiency in English (Wang, 2014).

3. Research Questions

The theoretical framework above indicates that participating in continuous peer feedback sessions may lead to an increase in mastery goal orientation and through this, strengthens ownership of learning. This has led to the following main research question:

> *Does participating in continuous peer feedback sessions have a positive effect on Dutch secondary school students' mastery goal orientation?*
>
> Hypothesis: it is expected that, when participating in continuous peer feedback sessions, the mastery goal orientation of the students within the intervention group will increase.

Furthermore, following from the theory of planned behaviour, the study aims to answer the following two sub-questions to try and explore possible factors that influence in the relationship between peer feedback sessions and mastery goal orientation.

1. *Does attitude towards peer feedback influence the relationship between peer feedback and mastery goal orientation?*
2. *Does student engagement in peer feedback sessions influence the relationship between peer feedback and mastery goal orientation?*

4. Method

4.1 Participants

The participants for this study were 52 secondary school students with an average age of 13.96 (*SD* = 0.41) divided into two classes of the Dutch 2 HAVO level at a secondary school in the province of Overijssel in the Netherlands. One class was assigned to the intervention condition and the other to the control condition. This was decided by coin toss. The intervention group consisted of 26 students (9 male, 17 female) and the control group also consisted of 26 students (20 male, 6 female). All participants were taught by the same English teacher and took part in all three assignments.

4.2 Research Design

This is a quasi-experimental study using a pre-test post-test design. Both conditions were assigned 3 writing assignments over a period of eight weeks. The intervention group gave and received peer feedback, and the control group only received teacher feedback. Before the first assignment, the participants of the intervention group received a short rater training, (see Materials section) as suggested in Li et al. (2019)

In the intervention group, the assessment criteria for every writing assignment was defined by the group and put in a rubric, as suggested in Falchikov (2004) and in line with the first of the three steps for giving feedback described by Sluijsmans et al. (2002). After having written the first draft, the students were to hand in the assignment through an online social learning platform called Eduflow and provide written feedback on the assignments of two classmates. This was done in Dutch, their native language, to avoid poor feedback due to limited proficiency (Wang, 2014). Both the provider as well as the receiver of the feedback remained anonymous to prevent peer pressure (Vanderhoven et al., 2012). Afterwards the students were given the possibility to respond to the feedback and improve their work before the final hand in. The third assignment, however, was submitted a second time through Eduflow, to undergo another round of peer feedback and possible revision before the final hand in. The reason for this second round of peer feedback was twofold. Firstly, the last assignment was given after a 2 week break and the interruption of the intervention might influence the results. Therefore, an extra round of peer feedback was assigned to counteract these possible effects. Secondly, giving feedback on written work that has already been reviewed and improved requires a more in depth approach since the surface issues have already been dealt with. During the intervention, the teacher kept track of the peer feedback

that is given, and sometimes comment on bad quality feedback to the student that provided the feedback, in line with Wang (2014). The last peer feedback session will be valuated within the grade of the last writing assignment. This will be announced to the students, to ensure an extra impulse to produce high quality feedback.

The control group did not make a rubric with assessment criteria. They were given the rubric that the intervention group had made. The students were to hand in the assignments through the electronic learning environment of the school, received extensive teacher feedback, got the opportunity to respond and make revisions.

After everything was handed in, the writing assignments were put together in a writing portfolio which was graded by the teacher.

4.3 Materials

4.3.1 Peer Assessment Tool

The peer assessment tool used was Eduflow (eduflow.com). This is an online social learning platform that allows students to hand in written work, and anonymously provide and receive feedback from peers. The program assigns the peer duos through an algorithm that establishes a unique duo every session. While the assessment exchange between students is anonymous, the assessment moderator is able to oversee who gave feedback to whom and the contents of the feedback. Furthermore, Eduflow has a wide range of options that can be added and modified. For this study, the program was used solely for its peer feedback functionality.

4.3.2 Rater Training

Before the first assignment, the intervention group was given a short rater training, to ensure quality of feedback. They were shown a piece of written work and were asked to give feedback. Afterwards, they were asked what criteria they had used to give feedback, and some of the feedback was written on the whiteboard. The students had to define which feedback was useful and which feedback was not. A discussion followed on what made feedback useful and what did not. Following, they were asked to first come up with criteria for critiquing written work, and were then shown another piece of written work on which they had to give feedback according to their criteria. It was stressed that the feedback had to be useful for the peer to improve the work. Furthermore, students were asked to point out a number of positive things about the work, things that should not be changed, and a number of

points for improvement. Students were not allowed to mend mistakes themselves, but to point the peer in the right direction. The teacher continuously stressed: "If this piece of written work would be graded a 6 ('sufficient' in the Dutch grading system), what would your peer need to do to get an 8 or a 9 ('good')?" The feedback that was then given was discussed and written on the board.

4.3.3 Writing Assignments

During the intervention, the participants were assigned three writing assignments that were complementary to the topics of the regular English curriculum at the school. In the first assignment (see Appendix A) the participants were asked to create a short Wikipedia page of a relative. In the second assignment (see Appendix B) participants had to write an article for Trip Advisor in which they wrote a tour guide of their home town. In both the first and the second assignment, the participants had to include vocabulary and sentences from their English textbook. The third writing assignment (see Appendix C) was a story writing assignment in which the participants had to create a story about the year 3022.

4.4 Instrumentation

As pre-test and post-test, a translated version of the revised personal goal orientation scales of the Patterns of Adaptive Learning Survey (PALS) (Midgley et al., 2000) was used to determine the students' goal orientation. This survey uses a 5 point Likert scale and consists of 5 items determining the level of the Mastery Orientation (α = .85) (MO), 5 items determining the Performance Approach orientation (α = .89) (PAP) and 4 items determining the Performance Avoidance orientation (α = .74) (PAV). The PALS survey does not include the Mastery Avoidance orientation. The translated versions of the survey were pilot tested with a comparable class of students (N = 20, $Mage$ = 13.72, SD = .36) and were found reliable with a Cronbach's alfa of (α = .75, .95 and .91) respectively.

Furthermore, the Dutch version of the Beliefs about Peer Feedback Questionnaire (BPFQ) (Huisman et al., 2020) was used in the study as an exploratory measure to check whether attitude towards peer feedback influenced the relationship between peer feedback and goal orientation. This questionnaire consists of four scales: Valuation of Peer-feedback as Instructional Method (α = .81) (VPIM); Valuation of Peer-feedback as an Important Skill (α = .73) (VPIS), Confidence in quality of Own peer-feedback (α = .82) (CO); and Confidence in Received peer-feedback quality (α = .75) (CR). This questionnaire covers not only attitude towards peer feedback, but also perceived confidence in own capability, and, when

considering the group results, their subjective norm. These are the three items in the planned behaviour model (Ajzen, 1991) that were found to predict active behaviour.

4.5 Procedure

The study started with conducting the pre-test. Both conditions filled in the PALS survey. This was done in accordance with the suggestions for survey administration of the PALS in Midgley et al. (2000). Students were told that the questionnaire is not a test, there are no right or wrong answers, and that some questions seem similar, but that this is done on purpose, and every question, no matter how similar, should be considered as an original question. Following, the intervention group received the rater training. After this, the first assignment was given to both conditions and the assessment criteria were constructed by the intervention group. The intervention group students made the assignment and handed it in through Eduflow, which was followed by the first peer feedback session consisting of providing feedback, responding to feedback, and revision. The control group students handed in the assignment with the teacher, and received teacher feedback, after which they had the opportunity for revision. Subsequently, the second and third assignment were given and the steps were repeated. Every assignment took approximately 2 weeks, from hand out to hand in. The BPFQ was administered in the middle of the intervention. The post test was conducted after the final assignment was handed in.

4.6 Data Analysis

The purpose of the study was to test whether or not a secondary school student's goal orientation could be prompted towards a more mastery orientation through a number of peer feedback sessions. For this purpose, the PALS questionnaire was used to determine the level of performance and mastery orientation before and after the intervention. Following, a paired samples t test was conducted to analyse the effect of the intervention, and an independent samples t test was carried out to compare the mean gain of the intervention group with the control group.

Since the intervention and control condition were not randomly assigned to every participant due to the school setting, the results of the first PALS questionnaire was also used to test for equality by administering an independent samples t-test.

As an exploratory measure, the Believes about Peer Feedback Questionnaire (Huisman et al., 2020) was administered in the middle of the data collection, to check

whether the attitude towards peer feedback influenced the relationship between peer feedback sessions and goal orientation.

Furthermore, for every participant, a record was kept of whether or not they had handed in the assignment on time, and made changes to their work to assess the student's engagement in the peer feedback sessions, and to analyse whether engagement influenced the relationship between peer feedback and goal orientation. A score is given for the number of 'in time hand-ins' (0 - 6) as well as the number of times the assignment is revised after peer feedback (0 - 3).

Regression analyses were performed with the different items of the BPFQ and student engagement as independent variables, and the mean gain of the mastery orientation as dependent variable.

4.7 Correlation Analysis

Before analysing the results, a correlation analysis was conducted on all variables to look for unexpected correlation. A highly significant correlation was found between PAP and PAV [$r(24) = .821, p < .001$]. This finding was not in line with Elliot and Harackiewicz (1996) in reporting that the Performance Approach orientation is clearly distinctive from the Performance Avoidance orientation. Murayama et al. (2011) however, mentioned that these goal orientations are often highly correlated. Therefore, an exploratory principal axis factor analysis with oblique rotation was conducted on the 14 items of the revised goal orientation scales of the PALS. This analysis reported three factors having eigenvalues over Kaiser's criterion of 1, however, the scree-plot showed a clear elbow after 2 factors. Therefore, a fixed factor analysis with two factors was done. Table 1 shows the factor loadings of this analysis. This revealed that all Performance Approach as well as the Performance Avoidance orientation items loaded onto the same factor. The items measuring the Mastery Goal orientation loaded onto the second. This showed that the translated version of the revised goal orientation scales of the PALS questionnaire was unable to isolate participants with a Performance Avoidance orientation from those with a Performance Approach orientation. Therefore, these scales were combined into one Performance Orientation scale (PO) and the analysis was continued utilizing a two factor model.

Table 1

Factor Loadings of Two-Factor Solution for Pre-Test Scores of 14 PALS Items (N = 52)

	Factor loading	
	1	2
One of my goals is to master a lot of new skills this year.	-.187	**.735**
It's important to me that I thoroughly understand my class work.	.109	**.540**
It's important to me that I learn a lot of new concepts this year.	.026	**.722**
One of my goals in class is to learn as much as I can.	-.053	**.763**
It's important to me that I improve my skills this year.	.182	**.508**
One of my goals is to look smart in comparison to the other students in my class.	**.659**	.086
One of my goals is to show others that I'm good at my class work.	**.621**	.319
It's important to me that other students in my class think I am good at my class work.	**.820**	.072
One of my goals is to show others that class work is easy for me.	**.892**	-.085
It's important to me that I look smart compared to others in my class.	**.759**	.226
One of my goals is to keep others from thinking I'm not smart in class.	**.773**	-.093
It's important to me that my teacher doesn't think that I know less than others in class.	**.671**	-.077
It's important to me that I don't look stupid in class.	**.852**	-.044
One of my goals in class is to avoid looking like I have trouble doing the work.	**.794**	-.071

Note. Factor loadings over .5 are presented in bold.

5. Results

5.1 Equality of Groups

In order to be able to test the effects of the intervention, equality of both groups had to be established. This was due to the fact that the individual students were not randomly assigned to a condition, but a condition was given to a class. Equality was measured through an independent samples t-test on the two scales of the pre-test. A Shapiro-Wilk test on the pre-test data displayed that the distribution of the Mastery Orientation scale (MO) met the assumption of normality in both the control as well as the intervention condition, however, as shown in Table 2, the Performance Orientation scale (PO) did not. Therefore, the t-test was performed on bootstrapped data.

Table 2

Shapiro-Wilk test of normality.

		W	*df*	*p*
MO	Control	.97	26	.642
	Intervention	.98	26	.811
PO	Control	.93	26	.064
	Intervention	.89	26	.008

Note. All p-values are 2 tailed.

The independent samples t-test showed that the control group could be considered equal to the intervention group on both scales: MO ($t(50) = -1.13$, $p = .264$), PO ($t(50) = .35$, $p = .728$).

5.2 Effect of the Intervention

After equality between groups had been established, the data was analysed further to test whether the intervention had had any effect. A paired samples t-test was conducted on the pre- and post-tests data of both conditions. This t-test was also conducted on bootstrapped data, as the normality assumption for t-testing could not be met on all scales. As shown in Table 3, there was a significant difference between the pre-test ($M = 3.34$, $SD = .73$) and post-test ($M = 3.78$, $SD = .65$) scores for MO in the intervention condition; $t(25) = 3.70$, $p = .003$. The other scores did not change statistically significantly.

Table 3

Paired samples t-test on scales of the PALS pre- and post-tests.

		Pre-test		Post-test			
		M	*SD*	*M*	*SD*	*t(25)*	*p*
MO	Intervention	3.34	.73	3.78	.65	-3.70	.003
	Control	3.56	.69	3.72	.76	-1.70	.101
PO	Intervention	1.89	.80	1.90	.78	-.04	.968
	Control	1.83	.60	1.86	.61	-.38	.715

Note. All p-values are 2 tailed. Results are based on 5000 bootstrap samples.

These results showed a positive change in MO scales within the intervention condition which indicates that the participants in the intervention group became more mastery oriented during the intervention. Subsequently, analysis was conducted to determine whether or not this change was significantly different from the change in the control group. Therefore, mean gain variables were calculated by subtracting the outcome of the post-test from the outcome of the pre-test. An independent t-test was conducted on the mean gain variables of both conditions.

Table 4

Independent samples t-test on mean gain of the intervention and control condition.

		M	*SD*	*t(50)*	*p*
MO	Intervention	0.44	.63	1.87	.034
	Control	0.15	.46		
PO	Intervention	<0.01	.54	-.19	.423
	Control	0.03	.40		

Note. All p-values are 1 tailed. Results are based on 5000 bootstrap samples.

Table 4 shows a significant difference in MO mean gain between the intervention and the control group which means that, while the participants in the intervention group became significantly more mastery oriented, the participants in the control group did not. The change in PO mean was not significantly different between the two groups.

5.3 Explanatory Analysis

In order to probe the reasons why some students became more mastery oriented, and others did not, two sub-questions were explored, and regression analysis was conducted to see whether or not beliefs about peer feedback, or student engagement, influenced the change in goal orientation. This was done by using the mean gain variables as dependent variables and the different scales of the Beliefs about Peer Feedback Questionnaire and the measured student engagement as independent variables.

Table 5 shows the outcome of the regression analysis of the BPFQ on MO [$R^2 = .09$, $F(4, 21) = .50$, $p = .733$] The model is not significant. This means that no evidence has been found supporting the idea that beliefs about peer feedback influences the relationship between peer feedback and mastery goal orientation.

Table 5

Regression Analysis: BPFQ and Mastery Goal Orientation

	B	*SE*	95% CI		*t*(25)	*p*
			LB	*UB*		
Intercept	-.14	1.16	-2.56	2.28	-.12	.904
Valuation of PF as an instructional method.	.44	.36	-.31	1.19	1.22	.238
Valuation of PF as an important skill.	-.23	.29	-.83	.36	-.82	.423
Confidence in own feedback quality.	-.07	.32	-.74	.61	-.21	.836
Confidence in quality received feedback.	.02	.25	-.50	.54	.08	.934

Note. CI = Confidence Interval; LB = Lower Bound, UB = Upper Bound

When looking at the descriptive statistics of the BPFQ it stands out that the intervention group scored fairly positive on their beliefs about peer feedback. The overall mean was 3.98 with a standard deviation of .49

Table 6 shows the outcome of the regression analysis of student engagement on MO [$R^2 = .07$, $F(2, 23) = .82$, $p = .453$]. This model is also not significant, showing that there is no evidence supporting the idea that student engagement influences the relationship between peer feedback and mastery goal orientation.

Table 6

Regression Analysis: Student Engagement and Mastery Goal Orientation

	B	*SE*	*95% CI*		*t*(25)	*p*
			LB	*UB*		
Intercept	.33	.38	-.45	1.12	.88	.388
On time hand-in	-.06	.09	-.25	.14	-.61	.546
Revised after feedback	.20	.16	-.13	.53	1.27	.218

Note. CI = Confidence Interval; LB = Lower Bound, UB = Upper Bound

The above mentioned results show that the participants of the intervention group increased significantly in mastery orientation. The scores for performance orientation did not change in the intervention, nor in the control group. Evidence for influence of beliefs about peer feedback, or student engagement on the relationship between peer feedback and mastery goal orientation were not found.

6. Discussion

Despite the abundance of studies on peer feedback, studies examining the effects of peer feedback on student ownership of learning (SOL) are missing. When regarding the conceptualization of SOL by Conley and French (2013) however, nearly all individual elements have been found to be positively influenced by peer feedback. All elements except for (mastery) goal orientation and persistence. Therefore the aim of this study was to add to this knowledge base and test the effect of continuous peer feedback sessions on students' mastery goal orientation.

6.1 The Influence of Peer Feedback on the Mastery Goal Orientation

In the hypothesis it was expected that the mastery goal orientation of the students within the intervention group would increase when participating in a number of peer feedback sessions. The results were in accordance with the hypothesis. The findings indicate that the students in the intervention group indeed became more mastery oriented. The students in the control group however, even though both groups did the exact same writing assignments, did not. These results can be connected to a number of factors.

Firstly, the intervention group formulated the assessment criteria for the rubric that both the intervention as well as the control group used. This was done because, according to Falchikov (2004), familiarity with and ownership of the criteria leads to an enhanced validity of peer feedback. As a result, this urged the intervention students to contemplate on what the intentions behind the assignments were. Full scores were only given when the writing product revealed that the underlying leaning goals had been mastered. Elliott and Dweck (1988) state that participants respond more mastery oriented when the learning goals are clear. This supports the idea that formulating assessment criteria induced the mastery orientation in the intervention students.

Secondly, the intervention group provided and received peer feedback, and the control group did not provide feedback, and received teacher feedback. While the feedback given by the teacher might have been of equal or perhaps even better quality, it is not so much the receiving, but rather the giving of feedback that enhances learning (Ion et al., 2019). Students in the intervention group were asked to give feedback in such a way, that they would help their fellow students towards a higher quality piece of written work, not by correcting their mistakes or telling them what they should alter, but rather by pointing them in the right direction and giving suggestions on how to tackle the problem. This requires higher order thinking (Topping, 1998), a trait associated with the mastery goal orientation (eg., Miller et al., 2021). Having given this feedback, students would return to their own writing assignment, to see how they had been reviewed, and perhaps to apply the feedback they had provided to their peer, on their own work. This reflective learning style has also been associated with the mastery goal orientation (Yan, 2018).

While the score for mastery orientation statistically significantly increased in the intervention group, the score for the performance orientation stayed relatively the same. It did not decrease as a result of the increased mastery orientation. This followed the expectation mentioned earlier in the theoretical framework that the different goal orientations are not mutually exclusive (Tuominen et al., 2020). Students can hold multiple goal orientations simultaneously.

6.2 The Influence of Attitude Towards Peer Feedback

The influence of attitude towards peer feedback on the relationship between peer feedback sessions and mastery goal orientation was analysed in an attempt to answer the first sub-question of this research. To test this, the Beliefs about Peer Feedback Questionnaire

(Huisman et al., 2020) was administered in the middle of the intervention and a regression analysis was done (see Table 5). The results do not indicate that attitude towards peer feedback influenced the relationship between peer feedback and mastery goal orientation. What stands out in the results is the fact that the intervention students seemed very positive about peer feedback with a rounded overall mean of 4 out of 5. Everybody liked the peer feedback sessions, no matter how they scored on the mastery orientation. When considering the planned behaviour model (Ajzen, 1991) this positive attitude would predict active behaviour since the attitude towards peer feedback, the subject norm, and the perceived behaviour control were positive. And indeed, during the intervention, active behaviour was observed at school, however, the greater part of the feedback session was done at home. There, the subject norm might have been different and attitude towards homework might differ from attitude towards peer feedback. Furthermore, the study lasted for a short time period of eight weeks in total. The beliefs about peer feedback might change however, when peer feedback is continued long term. Students in a longitudinal study by Wang (2014) became bored with peer feedback over time. This boredom might be of influence on the mastery goal orientation.

6.3 The Influence of Student Engagement

The influence of student engagement on the relationship between peer feedback sessions and mastery goal orientation was analysed to try and answer the second sub-question of this research. To test this, a record was kept of whether or not the students handed in their assignments on time, and whether or not they made any revisions after feedback. Regression analysis (see Table 6) did not reveal any indication that student engagement influenced the relationship between peer feedback and mastery goal orientation in any way. A possible reason for this might be the way student engagement was operationalized. Analysis of student engagement was done by evaluating punctuality, and revision of the participants' own work and thus, the effect of received peer feedback. However, Van Popta et al. (2017) indicated that students gain more from providing feedback than receiving feedback. Analysis of the punctuality and extend of the feedback given might have provided different results.

6.4 Feedback seeking behaviour

Apart from our research objectives, a positive development was observed during the intervention. After a number of peer feedback sessions, students in the intervention group began to ask their peers for feedback between iterations and in other assignments and

different subjects. They told that they had sought peer feedback because they had noticed the positive effect in their writing skills and wanted to apply this effect to other subjects as well. This is in line with Yan (2018) and Leenknecht et al. (2019) who state that the mastery goal orientation evokes self-directed feedback seeking behaviour.

6.5 Limitations and Future Research

Even though the main hypothesis of this research was confirmed, and the outcome is valuable, there are a number of limitations that need to be mentioned. Firstly, due to the small number of participants in the intervention ($N = 26$) and control ($N = 26$) group, the generalizability of these findings is somewhat limited. Furthermore, the sample does not represent all secondary school students. Future research should be done on a greater number of students, across multiple secondary school levels and grades. This would greatly benefit the generalizability. Another limitation is that the researcher and the teacher of these students is the same person, and the scores for the PALS as well as the BPFQ were self-reported by the students. This increases the risk for social desirability bias. Even though this risk was anticipated beforehand, and the teacher repeatedly assured the students that there were no right or wrong answers to the questionnaires, the risk remains. In future research this risk of social desirability can be decreased by administering the questionnaires through an external individual. Lastly, the present study was done over a time period of 8 weeks which makes it difficult to make any conclusions concerning durability of the effects. A longitudinal study would shed light on whether or not these effects maintain over time. Furthermore, a longer study might be better able to reveal an influence of either beliefs about peer feedback, or student engagement on the relationship between peer feedback and mastery goal orientation.

6.6 Conclusions and Practical Implications

The results of this study are very valuable for teachers of secondary schools that wish for more mastery oriented students. While the present study only used writing assignments, due to the fact that they can easily be anonymised, peer feedback could be utilized across multiple different language skills, and perhaps even in other subjects than second language learning. While our results suggest that peer feedback sessions strengthen the mastery goal orientation, they should be applied consciously, and in moderation. Studies (eg., Wang, 2014) show that poor application of peer assessment or too much peer feedback might undo the positive effects.

Since goal orientation is one of the elements of Conley and French's (2013) model of student ownership of learning, this study adds to the knowledge base concerning the relationship between peer feedback and SOL. Nearly all elements of the model have been found to be positively related to peer feedback, and this study adds mastery goal orientation to this equation. Furthermore, it was observed that students who became more mastery oriented, started seeking more peer feedback between iterations and in other subjects. If peer feedback positively influences MO, and in its turn, MO induces peer feedback seeking behaviour, an upward spiralling pattern is revealed that might prove to be useful for teachers seeking ways to make learning more active, more deliberate and more meaningful.

Learning in secondary school is often an individual endeavour. Even though secondary school students are enrolled in groups, much of the learning is done alone, and is evaluated by a standardised test which yields a grade. This causes many students to see the grade, rather than the knowledge, as a reward for their efforts. Providing peer feedback to fellow students adds a social element to this context and stimulates students to focus more on the underlying learning goals rather than basic theory. This might trigger a change in goal orientation. Negative feedback is not proof of incompetence, yet, an opportunity to learn and eventually master. And grades reduce to what they were meant to be: a mere test result.

7. References

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Appendix A

Wikipedia page:

Write a Wikipedia page about an acquaintance of yours (like your father, uncle or neighbor etc.). Write down everything interesting that there is to know about them. Their childhood, their profession, your relation to them, why you chose them etc. Use some sentences and vocabulary of chapter three. Mind! If there is an actual Wikipedia page about that person, do not copy and paste sentences!

Mind the rubric below, which we created in class.

Hand in your page on Eduflow for peer feedback, then revise your page and hand it in through ELO.

	0,5	1	1.5	2
Vocabulary from the list	5 words	5 – 10 words	10 – 15 words	15 + words
Sentences from the list	2 sentences	3 sentences	4 sentences	5 or more sentences
Readability	Almost not understandable	Average	Good	Fantastic
Punctuation	Forgot a lot of capital letters, commas, full stops.	Average	Good	Almost without mistakes
Informative	A little	Average	Good	Very informative

Appendix B

Tripadvisor:

You are going to write an article for Tripadvisor that is intended for tourists visiting your village / city. When a tourist visits your hometown, what should they see? Where should they go? Name at least three 'famous' sights in your area, and tell a bit about the history, or why these sights should not be missed. Also, where can the tourists get a good meal, or where can they spend the night? Lastly, name something they should absolutely avoid and why.

Write in article style. There has to be a logic order to the story and try and use some nice vocabulary and sentences from chapter 4. Try and make your article fun to read, so that tourists do not have to struggle to read the entire thing, and are excited to go to your hometown. Some jokes are allowed.

Hand in your writing assignment through Eduflow for peer review, and after revision, hand it in on ELO.

Write between 200 and 400 words.

	0,5	1	1,5	2
Vocabulary from the list	< 5 words	5 – 10 words	10 – 15 words	> 15 words
Sentences from the list	2 sentences	3 sentences	4 sentences	5 sentences
Grammar	1 instance of the future tense and 1 quantifier	2 instances of the future tense and 2 quantifiers	3 instances of the future tense and 3 quantifiers	5 instances of the future tense and 5 quantifiers
Informative	Not informative at all	Somewhat informative	Very informative	Could be placed on Tripadvisor
Creativity	Booooooring!!!	Somewhat nice fun to read	Very enjoyable.	Could be published

Appendix C

Futureworld:

Imagine it is the year 3022. You are standing in your hometown. A lot has changed. What do you see? Where do people live? How do they travel? Are there new technologies? Perhaps something happened in the (then) past that had a big impact?

Write a short story from the perspective of the I. This could be you (through time travel), or someone living in 3022. The story should be cohesive and should be interesting to read. Through the story, tell what is different or describe futuristic changes / technology. Think of an interesting plot. You could use the following steps to structure the story:

Introduction: Briefly introduce the main character and the setting of 3022.

Rising action: Give the main character a problem he/she has to overcome.

Climax: The character is solving / not solving the problem.

Falling action: The result of the problem being solved / not solved.

End

	0,5	1	1,5	2	
Spelling	A lot of mistakes > 20	Some mistakes > 15	A few mistakes > 10	Almost no mistakes < 5	
Grammar	A lot of mistakes > 15	Some mistakes > 10	A few mistakes > 5	Almost no mistakes < 5	
Cohesiveness	Can't make heads or tales	Somewhat vague	I can see where you are going	Everything is clear	
Catchiness	Very dull	It's ok	Not bad!	Can't wait to read more of you!	
Futuristic elements	Almost no future elements	Some future elements	A lot of future elements	A true science fiction.	